

ENVIRONMENTAL IMPACT ANALYSIS (ANDAL)

INTEGRATED ACTIVITIES OF THE TANGGUH LNG EXPANSION PROJECT

Teluk Bintuni Regency and Fakfak Regency,
Papua Barat Province



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SKKMIGAS
Wisma Mulia Lantai 35
Jl. Jend. Gatot Subroto No. 42
Jakarta 12710



BP Indonesia
Perkantoran Hijau Arkadia
Tower D & E
Jl. T.B. Simatupang Kav. 88
Jakarta Selatan 12520

DISCLAIMER

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FOREWORD

BP Berau Ltd. (“BP”) as the Operator of Tangguh LNG currently operates the Tangguh LNG facility which consists of the LNG Train 1 and 2 and supporting facilities, two offshore platforms, two subsea pipelines and fourteen production wells in Bintuni Bay, Teluk Bintuni Regency, West Papua Province. The existing Tangguh operates under an Integrated AMDAL that was approved through the Minister of Environment Decree No 85 Year 2002 concerning Environmental Feasibility of the Business and or Integrated Activities of Gas Exploitation, LNG Facility, Sea Port, Airfield and Tangguh LNG Resettlement by Pertamina-BP in Manokwari Regency, Sorong Regency and Fak Fak regency, Papua Province. .

To increase Tangguh LNG production capacity, BP and its partners plan to expand the Tangguh LNG facilities. Initial expansion is planned to include LNG Train 3, two platforms (ROA and WDA), several additional wells (production and exploration wells, DCRI wells) including some infill wells, two subsea pipelines, a combined LNG and Condensate Jetty and other supporting facilities. Further development of gas supply including gas supply for LNG Train 3 and development of LNG Train 4 is planned as part of the overall expansion project and included in the TEP AMDAL Scope.

Based on Article 50 Clause (2) and (4) of the Government Regulation of the Republic of Indonesia No. 27 Year 2012 concerning Environmental Permit and MoE Letter No. 11429/Dep.I/LH/12/12/2011 dated December 7th, 2011 concerning Environmental Assessment Guidance, the Proposed Tangguh LNG Expansion Project shall be completed with a new Environmental Impact Assessment (AMDAL) Study to be approved by the Central AMDAL Commission under the Minister of Environment.

This Environmental Impact Statement (ANDAL), Environmental Management Plan (RKL), and Environmental Monitoring Plan (RPL) are prepared in accordance with Minister of Environment Regulation No. 16 Year 2012 concerning Guideline of Environmental Document Development as well as ANDAL Terms of Reference (KA-ANDAL) that was approved by Ministry of Environment dated July 24th, 2013 according to Decree of the Deputy Minister of Environment of Environmental Governance Sector as a Chairman of Central AMDAL Commission, Ministry of Environment No. 30 Year 2013 concerning ANDAL Terms of Reference (KA-ANDAL) of the Proposed Tangguh LNG Expansion Project in Teluk Bintuni Regency and Fakfak Regency, Papua Barat Province by BP Berau Ltd. .

We would like to express our appreciation to all parties who assist the development of the AMDAL (Environmental Impact Assessment) document of the Proposed Tangguh LNG Expansion Project.

Jakarta, July 2014
Project Proponent,



BP Berau Ltd.



Roberto Reichard
VP Projects, Tangguh

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 Sea Water Quality, *Sediment*, *Surface Water Quality*, *Groundwater Quality*, and *Ambient Air Quality*
 (Dry Season 2012)

- II.2 Environmental Baseline Data:
Sea Water Quality, Sediment, River Water Quality, Groundwater Quality, and Air Ambient Quality
(Wet Season 2013)
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LIST OF ACRONYMS

ADDAMS	=	Automated Dredging and Disposal Alternatives Modelling System
Ag	=	Silver
AGI	=	Acid Gas Incinerator
AGRU	=	Acid Gas Recovery Unit
Aggradation	=	Raised surface due to continuous or intermittent sedimentation process
Aquifer	=	Pore layer composed of rock, sand, and other material below the soil surface containing water, from where well water originates
Al	=	Aluminum
Alkalinity	=	Measure of water capacity to neutralize strong acids
Alluvial	=	Related to detrital sediment, which is eroded, transported, and deposited by river current
Alluvium	=	Detrital sediment eroded, transported, and deposited by river flow
Alotonus	=	Originating from anywhere; not indigenous to a particular place
Ambient	=	Referring to existing condition or most prominent
AMDAL	=	Environmental Impact Assessment
Anaerobic	=	Condition in which oxygen is not required, and as a result does not enable normal life depending on the presence of oxygen. Several bacteria are able to survive in this condition
ANDAL	=	Environmental Impact Statement
Anemometer	=	Instrument to measure wind speed
Offshore Platform	=	Structure or building constructed offshore to support the exploration or production process of mine materials
Drilling Platform	=	A structure with equipment to drill into underground reservoir to obtain oil or natural gas present in the sea at relatively shallow depth
Annulus	=	Space between two concentric objects and fluids are able to flow, for instance between casing and bore well or between casing and tubing

Anoxia	=	A condition where oxygen is absent
Anthropogenic	=	Caused by human beings
ANZECC	=	Australian and New Zealand Environment and Conservation Council
APK	=	Rough Participation Figure
AQ	=	Air Quality
AQN	=	Air Quality and Noise
Flood current	=	Flood current, marked by increase in height of tidal current. Flood currents are usually evident on the coast, or moving toward the coast
Rectilinear Current	=	Flood current estimated to move in opposite direction during ebb tide in each reverse direction. Backflow usually occurs in rivers and in straits where the current is obstructed
As	=	Arsenic
Attenuation	=	Reduction in intensity of noise or light caused by absorption and transmission of noise or light energy by air or water
Autotonus	=	Indigenous to a particular place
Avifauna	=	Birds found in a region or in a specific time
B	=	Boron
B3	=	Hazardous and Toxic Materials
Ba	=	Barium
Ballast water	=	Water loaded on vessel to maintain ship balance
BAPEDAL	=	Environmental Impact Control Body
Bathimetry	=	The science studying measurement of sea depth to determine seabed topography
Benthic	=	Marine environment inhabited by sea organisms living permanently in or on the surface of the seabed
Benthos	=	Marine life found in or on the surface of the seabed
Specific Gravity	=	Ratio of mass density of a certain substance to mass density of distilled water at temperature 4°C and pressure of 1 atm.
Calcareous	=	Consisting of or containing calcium or calcium carbonate
Bioaccumulation	=	Gradual accumulation process of industrial waste, chemical toxin, and so on in living tissue
Bioavailability	=	Related to amount of substance, either in chemical or physical decomposition, which can be immediately available for utilization by organisms (for instance nutrients)

Biochemical Oxygen Demand (BOD)	=	Amount of dissolved oxygen required to decompose organic material in wastewater
Biodegradation	=	Biological process of decomposition
Biogenic	=	Produced physiological activities of organisms
Biomass	=	Total living organism per unit surface or volume of water expressed in unit of weight
Biocide	=	Toxic chemical able to kill living organisms
Bivalve	=	A class of mollusc (pelecypoda or lamellibranch) usually attached to or covered in soft sediment, rock, wood, or other object. Individuals have shells with joints and axe- sharp legs, which are used to dig. Clams, oysters, and bivalves are part of this group.
BL-BD	=	Northwest - Southwest
BOD	=	Biochemical Oxygen Demand
BOF	=	Bulk Offloading Facility
BOG	=	Boil-Off Gas
BP Berau Ltd. ("BP")	=	Tangguh LNG Operator , for and on behalf of all holders of participatory interest in KKS Tangguh ("Tangguh Business Partner")
BPS	=	Central Statistical Body
Breasting Dolphin	=	Poles or other structures used for ships mooring
BS	=	Base Saturation
BTEX	=	Benzene Toluene Xylene
CaCO ₃	=	Calcium Carbonate
CAD	=	Computer Aided Design
Reserves	=	Quantity of renewable gas, oil, or mineral reserves , estimated to be present between sub-surface borders set
Secchi Disc	=	Disc or plate of white, black color and variations, of diameter 30 centimeters, used to measure transparency of water. The disc is placed in a water column and at depth (in meter) when the disc is not visible, averaged with the depth at the time the disc re-appears. The mean value is used to indicate transparency of sea water.

CAP	=	Community Action Plan
CBL	=	Convective Boundary Layer
CD	=	Chart Datum
Cd	=	Cadmium
CEC	=	Cation Exchange Capacity
CEMS	=	Continuous Emission Monitoring System
CITES	=	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Cl	=	Chloride
Chemical Oxygen Demand (COD)	=	Amount of dissolved oxygen required to oxidize organic materials in wastewater in acid condition
Chenier	=	Low sandy coastal area
CN	=	Cyanide
CNOOC	=	China National Offshore Oil Corporation
Co	=	Cobalt
CO	=	Carbon Monoxide
COD	=	Chemical Oxygen Demand
CORMIX	=	Cornell Mixing Zone Model
CPI	=	Corrugated Plate Interceptors
Cr	=	Chromium
CRA	=	Corrosion Resistant Alloy
CTD	=	Conductivity, Temperature and Depth
Cu	=	Cuprum (Copper)
CV	=	Comanditer Vennootschap
Watershed	=	Area of land receiving water, channeling water, sediment, and dissolved particles in receiving area or outflow channel. May also include sub-surface interaction, similar to surface water
DAF	=	Dissolved Air Flotation
DAS	=	River Basin
dB(A)	=	Decibel Type A
DCRI	=	Drill Mud and Cutting Reinjection
DED	=	Detailed Engineering Design
DEM	=	Digital Elevation Model
Salt water wedge	=	Sea water intrusion into the River bed
Decibel	=	Value indicating noise ratio in two different intensities. This value is 10 times the logarithm ratio between two noise intensities
Deck	=	The main component of offshore platform, the deck is a frame structure supporting functional facilities

	=	combined with equipment, bridge, etc
Dendritic	=	Tree-shaped
Desalinisation	=	Process of reducing dissolved salt from seawater (sea water purification process), so that sea water is drinkable
Dispersion	=	Breaking down wave disturbance by very complex surface gravitation into its component parts
Director General for Oil and Gas	=	Directorate General for Oil and Natural Gas
DO	=	Dissolved Oxygen
DPL	=	Above Sea Level
DR	=	Dependency Ratio
Dredge	=	Dredging vessels are designed to dredge/raise deposit from channels or dock area to maintain the required water depth.
DWT	=	Dead Weight Tonnage
DPH	=	Hypothetical Significant Impact
EBLS	=	Environmental Baseline Study
EBB	=	Low tide current associated with lowering of flood current surface. The current generally moves in the direction of the sea, or in opposite direction with movement of flood current
EC	=	Electro conductivity
EDG	=	Emergency Diesel Generator
Ephemeral	=	Short-lived
Effluent	=	Waste Material in Liquid Form
EHI	=	Erosion Hazard Index
EIA	=	Environmental Impact Assessment
Exploration	=	Activity for the purpose of acquiring information on the geologic condition to find and obtain estimated reserves of Oil and Natural Gas in the specified Work Area
Production	=	A string of activities performed for the purpose of producing Oil and Natural Gas from the specified Work Area, consisting of well drilling and completion, building transport, storage and processing facility for separating and refining Oil and Natural Gas in the field and other supporting activities.
Emulsification	=	Stabilizing process of colloid suspension consisting of immiscible fluid, dispersed and supported in other fluids
Endemic	=	Related to areas where certain types of organisms have evolved

Entomology	=	The branch of zoology studying insects
EP	=	Equatorial Principal
EPAM	=	Environmental Particulate Air Monitor
EPC	=	Engineering, Procurement and Construction
Epibentik	=	Related to fauna living on the surface of the seabed
Epibiota	=	Related to organisms living on various surfaces or on other organisms
Erosion	=	Every or all processes of eroding and transporting soil particles or rock from one place to another
Estuary	=	Bay or river estuary affected by tides, formed as a result of inundation or flooding of the lowest part of the river plain non-glaciated and containing a measurable quantity of sea salt
Evaporation	=	Evaporation is the physical process of change from liquid or solid phase to gas phase
F	=	Fluoride
Fe	=	Ferrum (Iron)
Feedgas	=	Gas originating from reservoir supplied to LNG train for further processing
FF	=	Far Field
FGD	=	Focus Group Discussion
FID	=	Flame Ionization Detector
Filariasis	=	Disease caused by a type of Nematode (Filaria worm)
Physiographic	=	Illustration of natural characteristics
Phytoplankton	=	Plankton possessing ability of photosynthesis
Flaring	=	Gas burning
Flocculation	=	Agglutination, when clay or colloid particle suspension in non-saline water experiences agglutination at the time of mixing with saline water and forming suspension; deposition process usually occurring in estuary systems
Fluorocarbon	=	Hydrocarbon, in which part or all of its hydrogen atoms are replaced with fluor atoms (such as Freon).
Acid gas	=	Carbon dioxide (CO ₂) and Hydrogen Sulfide (H ₂ S) present in natural gas when combining with vapor forms corrosive acid. Also known as acid gas if H ₂ S and mercaptans are present
Gastropod	=	A class of mollusk evolving forming a distinct head, generally possessing eyes and tentacles with flat and wide legs, and its entire body is usually covered by spiral shell

Coriolis Force	=	Force acting on particles in motion because of the earth's rotation. This results in the particle making a turning movement to the right in the northern hemisphere and to the left in the southern hemisphere; the process is proportional to speed and space to move and unable to change the particle speed
GC-FID	=	Gas Chromatography-Flame Ionization Detector
GEMSS	=	Generalized Environmental Modeling System for Surface Waters
Tidal Scour	=	Downward and sideward erosion of sediment bed due to waves and current
GHG	=	Green House Gases
GIFT	=	Generalized Integrated Fate and Transport
Gleisol	=	Soil dominated by clay-silt fraction particles and clay - silt-loam resulting from anaerobic iron reduction and inundated environmental condition
GPF	=	Gas Production Facility
GPFSB	=	Gas Production Facility Shore Base
GPS	=	Global Positioning System
Grains	=	Individual soil particles forming sediment, with size range smaller than 0.0039 mm (clay particles) to over 256.0 mm (gravel)
Grassroots	=	Complete facility built on natural site
Gravimeter	=	Instrument or equipment sufficiently sensitive to record variations of constant mass weight when mass moves from one place to another on the surface of the earth, so that - therefore - considered as the cause of gravitation impact on those places
GW	=	Ground Water
Habitat	=	Area inhabited by flora and fauna species
HAM	=	Human Rights
HC	=	Hydrocarbon
HDD	=	Horizontal Directional Drilling
HDI	=	Human Development Index
HDM	=	Hydrodynamic Module
Hg	=	Hydrargyrum (Mercury)
Hydrodynamics	=	Study of movement of liquids
Hydrology	=	Scientific study of water present on the earth, mainly in relation to the effects of precipitation (rainfall, snow, etc.) And evaporation and evapotranspiration toward the character and occurrence of water flow in rivers, lakes, and water flow above and below the ground surface

Hindcasting	=	Prediction or estimate of several past situations using known predictor
HIV	=	Human Immune Virus
HP	=	High Pressure
HPH	=	Forest Concession
HRSG	=	Heat Recovery Steam Generator
IDF	=	Intensity-Duration-Frequency
IFC	=	International Finance Corporation
ILO	=	International Labour Organization
IMO	=	International Maritime Organization
IMS	=	Sexually Transmitted Disease
Infauna	=	Animals that live buried in soft substrate (sand or mud)
Infrastructure	=	Facility, equipment, and basic services required for proper industry operation and for the community
Intelligent Pig	=	A pig that can perform pipe internal inspection using non-damaging technique
Intertidal	=	Benthic zone between flood tide and ebb tide
Core	=	Vertical and cylindrical sample of sea bottom sediment from the initial seabed condition and determined stratification
Inundation	=	Submerged or covered by flood
IP	=	Indigenous People
IPB	=	Bogor Agriculture Institute
IPCC	=	Intergovernmental Panel on Climate Change
IPM	=	Human Development Index
IPAL	=	Wastewater Treatment Installation
ISD	=	Inherently Safe Design
ISO	=	International Organization for Standardization
Isobath	=	Contour lines connecting points of similar water depth in a chart
Isopleth	=	Lines connecting points of similar numerical value in a chart
IPDP	=	Indigenous People Development Plan
ISP	=	Integrated Social Program
ISPA	=	Acute Respiratory Tract Infection
Isthmus	=	Land adjacent to or both sides bordering on water connecting two wider land sections
ITB	=	Bandung Institute of Technology
IUCN	=	International Union for Conservation of Nature and Natural Resources

IWMF	=	Integrated Waste Management Facility
Jacket	=	Structural frame component of an offshore platform providing support to lateral poles
Jetty	=	Structure, such as dock or pier, positioned to control current or waves or protect the entrance to the port or river
JNCC	=	Joint Nature Conservation Committee
K	=	Potassium
KA	=	Terms of Reference
Cambisol	=	Soil formed through physical and chemical weathering process of rock and/or Pleistocene or Holocene era deposits; usually saturated
Diversity	=	Diversity. See: biodiversity
Biodiversity	=	Related to number of different species and the number of associations of individuals living in a community
Species Richness	=	Number of organism species in a community
KepMen	=	Minister's Decision
Chemisorption	=	Adsorption, especially if the process is irreversible, with chemical force, the reverse of physical force.
Chlorofluorocarbon	=	Hydrocarbons formed because part of or all hydrogen atoms are replaced by chlorine and fluorine atoms (known as cfc's)
KKKS	=	Production Sharing Contractor
KKS	=	Production Sharing Contract
KLH	=	Ministry for the Environment
KMnO ₄	=	Potassium Permanganate
KO	=	Knock Out
Coliform	=	Indicator organism, such as e. Coli, which if found may indicate the possibility of more hazardous micro-organisms
Condensate	=	Hydrocarbons present in gas in reservoir condition, but liquefying - both through well hole or in surface equipment, through heating and pressure process
Condensate Gas	=	Liquid produced from gas condensation process
Conductivity	=	Facility in which a material produces electricity, indicated by current density per unit electric potential gradient following direction of current. An intrinsic characteristic of sea water varying according to temperature, salinity, and pressure
KPAD	=	Regional AIDS Management Commission
Cryogenic	=	Related to very low temperatures, generally in the range of -160° C to -50° C

Quadrat	=	Square- or rectangular-shaped sampling area
Langrangian	=	Related to observation method by following the movement of water mass toward the sea
Field	=	An area having one or more reservoirs
Larva	=	Embryo able to live self-sufficiently and independently before having the same characteristics as its parent
LAT	=	Lowest Astronomical Tide
LC50	=	Lethal Concentration 50%
LCR	=	Local Control Room
LCT	=	Landing Craft Tank
LEBM	=	Community-Based Economic Organization
Plate Tectonics	=	Theory stating that the earth's surface consists of layers, or large plates, with constant movement causing the emergence of continents, mountains, and so forth.
Lentic	=	Water ecosystem composed of still water
Leq	=	Equivalent Sound Level
LH	=	Environment
Hazardous waste	=	Residual disposed industrial production waste, mainly from chemical industries, detrimental to the environment or hazardous to human and animal health
LIPI	=	Indonesian Institute of Sciences
Liquefaction	=	Change of a substance into solid through cooling or compression.
Lithosphere	=	Relating to the earth's crust
LNG	=	Liquefied Natural Gas
Heavy Metals	=	Metal element with high specific gravity (5.0 or over)
Lotic	=	Water ecosystem composed of flowing water.
LPG	=	Liquefied Petroleum Gas
LP	=	Low Pressure
Ltd	=	Limited
Drilling Mud	=	Preparation of water, mud, and chemicals circulating in oil well drilling to lubricate and cool the drill bit, push disposal material to the surface , and to line the well walls to prevent collapse
MARPOL 73/78	=	Marine Pollution Year 1973 and 1978, International Convention for the Prevention of Pollution from Ships
Magnetometer	=	Instrument to measure intensity and/or direction of the earth's magnet
MBAS	=	Methylene Blue Active Substances
MCB	=	Main Control Building

MCHE	=	Main Cryogenic Heat Exchanger
MDEA	=	Methyl diethanolamine (for acid gas separation)
Mediterranean	=	Rendzina and Mediterranean soil types, produced from weathering of sediment rock, mainly limestone
Mg	=	Magnesium
Mn	=	Manganese
MODU	=	Mobile Offshore Drilling Unit
Mooring Dolphin	=	Poles or other structure installed to secure vessels
Morphology	=	Study of form and structure
MPSV	=	Multipurpose Support Vessel
MR	=	Mixed Refrigerant
MRU	=	Mercury Removal Unit
MSDS	=	Material Safety Data Sheet
MTPA	=	Million ton per annum
Musrenbang	=	Development Planning Consultation
µm	=	Micrometer
MW	=	Mega Watt
N	=	North
Na	=	Natrium
NE	=	North East
Nekton	=	Large fauna living in water column and swimming freely (for instance tuna fish).
NF	=	Near Field
Ni	=	Nickel
Nm ³	=	Normal Cubic Meter
NO ₂	=	Nitrogen Dioxide
NO ₃ -N	=	Nitrogen Nitrate
NRCS	=	Natural Resources Conservation Service
NTU	=	Nephelometric Turbidity Units
NUI	=	Normally Unattended Installation
NW	=	North West
O ₃	=	Ozon
OCIMF	=	Oil Companies International Marine Forum
ODV	=	Ocean Data View
Offsite	=	In the processing train site, each supporting facility that is not part of the main processing train or a utility system
Ophiolitic	=	Illustrating igneous rock group representing part of the

	=	earth's crust seabed in the past
ORF	=	Onshore Receiving Facility
Organosol	=	Peat soil formed from organic decomposition in water saturated condition
Orogeny	=	Formation of mountain due to structural deformation of the earth's crust, mainly by the occurrence of folds and faults
OSCP	=	Oil Spill Contingency Plan
OSU	=	Oregon State University
OSV	=	Offshore Support Vessel
OTPS	=	OSUTidal Prediction Software
OWS	=	Oily Water Separator
P	=	Phosphorus
PAH	=	Polycyclic Aromatic Hydrocarbon
Latent Heat	=	Heat released or absorbed per unit mass by reversible system; phases of isobaric-isothermal change
Slack Tide	=	Interval when the high tide velocity is very weak or zero; mainly relating to reversal period between ebb tide current and flood tide current
Spring Tides	=	High tide with increasing range, occurring every two weeks during the new moon or full moon
Fault	=	Fault or fault zone of the earth's crust, in which one side of the rock shifts toward the other side. Intersection between surface of fault and specific surface, for instance sea floor, is known as fault line. If the fault line is not a single intact fault but a wide zone (hundreds or thousands of feet) with small intersecting faults and filled by breccia, it is known as a fault zone
Thrust Fault	=	Nearly level fault, in which the hanging rock wall appears to be thrust upward by the foot of the wall
Strike-Slip Faulting	=	Fault parallel with direction of inter-strata collision intersected
Brackish	=	Water with salinity figure of between 0,50 ppt to 17,00 ppt
Pb	=	Plumbum (Tin)
PC	=	Public Consultation
PCDP	=	Public Consultation and Disclosure Plan
Pelagic	=	Related to sea water column and organisms inhabiting it
Pemkab	=	Regency Government
Stratified Sampling	=	Sampling technique used in condition of measured variable in population or area sampled that is not homogenous, performed by sorting in two or more

		parts that are relatively more homogenous than the overall population.
Remote Sensing	=	Collecting and interpreting information of a target (on the earth's surface) without physical contact with the object studied (for instance through satellite image or aerial photo)
PerDa	=	Regional Regulation
Wave Period	=	Time, in seconds, required by peak wave to travel the same distance as one wavelength
Percolation	=	Filtering through absorptive substance, such as soil
Permeability	=	Capacity of soil to allow water to pass through it
PerMen	=	Minister's Regulation
Tracer	=	A substance, usually radioactive isotope, used to trace chemical process or complex sequence of biochemical reactions in order to determine physical properties
pH	=	Degree of acidity/ symbol showing degree of acidity or alkalinity of a solution
Pig	=	A special small device that can be moved through a pipe to examine and/or remove impurities caused by biological growth or chemical process
Pig trap	=	Trap mechanism or place to collect "pig"
Plankton	=	Organism floating passively and swimming weakly in saline and non-saline water. The size range of group members is from microscopic to jellyfish with diameter size of over 6 feet, and including nekton and benthos eggs and larva
PM _{2,5}	=	Particulate Matter with diameter of less than 2.5 micrometers
PM ₁₀	=	Particulate Matter with diameter of less than 10 micrometers
POB	=	People on Board
Podzolic	=	Soil formed as a result of physical and chemical weathering of rock and/or Pleistocene or Holocene period deposit; usually wet and mottled
Polychaeta	=	An order (polychaeta) of anelide the majority composed of sea worms, including harmful long worms
Population	=	A similar species of living creature group occupying a certain space in a certain time
Porosity	=	Ratio between volume of empty space and volume of soil solids
Processing Train	=	A complete series of processing equipment installed according to a determined sequence
Profile	=	1. Diagram showing vertical part along a line

surveyed

2. Graph illustrating ordinate variations of several oceanographic quantities along a straight line to level distance as the abscissa

Propagation	=	Transmission of energy through a media
Sound Propagation	=	Sound waves spreading through water media .
Fluvial Process	=	Process of transporting discharge from land to sea and collection point ,and subsequent distribution , for instance waves and current
PP	=	Government Regulation
ppm	=	part per million
ppmv	=	Parts per million by volume
PSC	=	Production Sharing Contract
PSK	=	Commercial Sex Worker
PT	=	Limited Liability Company
PW	=	Produced Water
PWT	=	Produced Water Treatment
RBI	=	Indonesian Topography Map
REA	=	Rapid Ecological Assessment
Reflectivity	=	Size of radiation fraction reflected by a particular surface
Relic	=	Physical, mineral, or structure characteristics remaining after other components are discharged or separated
Rendzina	=	Rendzina and mediterranean soil type, produced from weathering of sediment rock, mainly limestone
Reservoir	=	Accumulation of sub-surface natural gas or oil in condition of natural containment
Riparian	=	Nearby, or on the banks of or side of a river, occasionally near lakes, ponds, etc
RKL	=	Environmental Management Plan
RMSE	=	Root Mean Square Error
RPL	=	Environmental Monitoring Plan
RRA	=	Rapid Rural Appraisal
ROV	=	Remotely Operated Vehicles
S	=	South
Salinity	=	Amount of dissolved salts in sea water
Sb	=	Antimony
SBL	=	Stable Boundary Layer
SBM	=	Synthetic Based Mud
Scat	=	Animal droppings
SDM	=	Human Resources

SE	=	South East
Se	=	Selenium
Sedimentation	=	Process of erosion and separation of particles from parent rock , transport, deposition, and consolidation into other rock form
Seismic	=	A geophysical exploration methodology using seismology principles to estimate the content of subsurface material (such as oil and gas) from results of seismic wave reflection
Seismicity	=	Phenomena of earth's crust movement
Seismogenic	=	Producing or causing earthquake
Shorebase	=	Facility on land as supplier of logistical needs of offshore project
Synergistic	=	Working together; cooperate
Synoptic	=	Presenting or use of weather data and atmospheric condition in wide area at a particular period
Richter Scale	=	Quantity indicating total energy caused by earthquake or earthquake force, as differentiation toward "intensity" illustrating the effect on a certain place. In 1935, c.f. Richter discovered the magnitude scale currently in use. The numerical scale ranges from 0 to 8.5
SKKMIGAS	=	Upstream Oil and Natural Gas Business Activity Special Implementing Work Unit
SNI	=	National Standard of Indonesia
SO ₂	=	Sulfur Dioxide
SO ₄	=	Sulfate
SOBM	=	Synthetic Oil Based Mud
Sonar	=	Acronym for "Sound Navigation And Ranging" , i.e. method or equipment to determine situation, location, and condition of object in the sea using sound technique
STD	=	Salinity, Temperature, Depth
STFATE	=	Short Term Fate
STG	=	Steam Turbine Generator
STI	=	Sexually Transmitted Infection
STP	=	Sewage Treatment Plant
Strata	=	Section, level, or division, of atmosphere or ocean , considered as layer
Stratification	=	Condition of liquid consisting of two or more horizontal layers formed on the basis of density; the overlying lighter layer and the underlying heavier layer.

Stratigraphy	=	Branch of geology emphasizing study of formation, composition, series and relationship of strata or parent rock
Infill well	=	Drilling toward reservoir to increase deliverability of existing production.
Appraisal well	=	Well drilled to evaluate oil/gas reserves in a reservoir previously discovered by exploration well
Surfaktan	=	Active surface matter
SW	=	South West
TAR	=	Turnaround (Major LNG Train Maintenance)
Laterite soil	=	Red-colored residue soil containing much aluminum and ferri-hidroksida, formed by advanced decomposition of rock and usually found in tropical rain forest with good drainage
TBC	=	Tuberculosis
Tcf	=	Trillion Cubic Feet
TCLP	=	Toxicity Characteristic Leaching Procedure
TDS	=	Total Dissolved Solids
TEAP	=	Tanggung Exploration and Appraisal Programme
TEG	=	Triethylene Glycol
TGU	=	Turbidity Generation Unit
Pile	=	The main component of offshore platform, piles are owned by company members providing vertical and lateral support
TL-TG	=	Northeast - Southeast
TLNG	=	Tanggung LNG Coordinates
TNI	=	Indonesian National Armed Forces
Topography	=	Surface configuration, including relief
TPAK	=	Work Force Participation Level
TPH	=	Total Petroleum Hydrocarbon
TPS	=	Temporary Storage Place
Trajectory	=	Trajectory path
Trestle	=	Movable support or framework , usually possessing dispersed diagonal legs
TS	=	Temperature-Salinity
TSP	=	Total Suspended Particulates
TSS	=	Total Suspended Solids
Tsunamigenic	=	Producing or causing tsunami (tidal wave)
Turbidity	=	Turbidity of water caused by the presence of suspended matter
Tycho plankton	=	Collection of algae carried

		to other substrate system, such as mud, soil or vegetation
UDC	=	User-Defined Constituent
UDHR	=	Universal Declaration of Human Right
UKL	=	Environmental Management Effort
UNGP-HR	=	United Nations Guiding Principles on Business and Human Rights
UPL	=	Environmental Monitoring Effort
USACE	=	United States Army Corps of Engineers
USLE	=	Universal Soil Loss Equation
US EPA	=	United States Environmental Protection Agency
UU	=	Law
VES	=	Vertical Electrical Soundings
VOC	=	Volatile Organic Compound
VSP	=	Vertical Seismic Profile
WBM	=	Water Based Mud
WHO	=	World Health Organization
Wind Rose	=	Diagram illustrating frequency and velocity of wind from various directions
Work-Over	=	Performing one or more variations of oil production well repair operation in expectation of being able to improve and increase production. Examples: deepening, sealing off, flooding, and linear re-installation, cementing pressure, shooting, and acidizing
WWT	=	Wastewater Treatment
Zn	=	Zinc
Littoral Zone	=	Coastal zone affected by sea tides
Zoning	=	Parallel ribbon of specific plant combination in tidal area
Subduction Zone	=	Subduction zone of earth's crust layer below other layers due to mutual collision
Zooplankton	=	Animal Plankton